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Composition, Endemism and Phytogeographical Affinities of the Taiwan Flora

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ABSTRACT: The Taiwan vascular flora is exceptionally interesting not only because it is rich and diversified, but because it is of great phytogeographic significance owing to its geographic location. The flora of Taiwan, including naturalized plants, comprises 233 families and 1389 genera with 4216 species. In terms of major growth forms, there are 588 trees, 426 shrubs, 249 lianas, 177 vines, and 2776 herbs or ferns. Approximately 234 species are exotics typically associated with pastures, road clearings and other human disturbances. An extremely large percentage of these naturalized plants are of tropical New World origin. Among the native flora, the Orchidaceae (331 species), Gramineae (249), Compositae (194), Leguminosae (176), Cyperaceae (174), Rosaceae (105), Rubiaceae (93) and Euphorbiaceae (76) rank highest in numbers of species. Clearly, the greatest part of Taiwan's floristics richness comes from a wealth of species in primarily lowland (0 - 600 m asl.) taxa. A total of 2571 species were recorded in the lowlands, whereas only about 251 species occur between 3100-3950 m.

Endemic genera are extremely scarce in Taiwan, with only four, namely *Sinopanax* (Araliaceae), *Hayatella* (Rubiaceae), *Kudoacanthus* (Acanthaceae), and *Haraella* (Orchidaceae). In contrast to the low percentage of generic endemism, there is a remarkably higher specific endemism. About 1041 species (26.1% of indigenous plants) are known only from Taiwan. A detailed examination of these species shows that there is a distinct trend of increasing endemism with increasing altitude ($r^2 = 0.99$). A survey of indigenous non-endemic species on the basis of their geographical distribution outside Taiwan shows that they can be classified into 6 major categories: 1. pantropical and palaeotropical species (1029 species); 2. species distributed in eastern Asia, from Himalayas through southern & eastern China to Taiwan, with some extending to the Ryukyus and Japan (1075 species); 3. widespread species extending from tropical Asia to eastern Asia (232 species); 4. species distributed in Japan and the Ryukyus (189 species); 5. species distributed in temperate and subboreal regions (221 species); and 6. cosmopolitan species (72 species).

The main theme of western affinity of Taiwan flora is clearly indicated by almost 52% of the total flora (2069 species) which are also represented in China. The alliances of the flora are also pronounced with the Ryukyus and southern Japan (1618 species in common). However, the close relationship between Taiwan and Japan is through their mutual relation to the lowland flora of southern and eastern China. The tropical elements, mostly ranging from Malaysia to the Philippines, are well represented in the lowlands of Taiwan and particularly in the southernmost Hengchun Peninsula and the Lanyu Island off the southeast coast of Taiwan.

KEY WORDS: Altitudinal distribution, Diversity, Floristic regions, Growth forms, Naturalized plants, Vascular plants.

INTRODUCTION

Taiwan, one of the largest islands off the east coast of continental China, is located at the edge of the tropics between Japan and the Philippines. The island has an area of 35,800 km², with a length of about 394 km, and a width of 140 km at its broadest. Two-thirds of the area is occupied by hills and mountains. From the west coast the land rises rapidly behind a narrow coastal plain to elevations of 3,000-3,950 m in the entire central part of the island. Because of the north-south alignment and a great range of altitudinal zones and varied climatic conditions,

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Taiwan possesses a wide range of habitats and, correspondingly, high biodiversity. Today, 50% of the country is covered by forests of fir, mixed conifers, and temperate and subtropical broadleaved species. For more general information on the physical background and vegetation of Taiwan see Hsieh *et al.* (1994).

The island of Taiwan and its associated islets are located near the boundary between the Holarctic and Paleotropical floristic kingdoms. Because of its geographical position and botanical wealth, the phytogeographic relationships of the Taiwan flora have interested botanists (e.g., Henry, 1896; Hayata, 1908; Merrill, 1923; Kudo, 1926; Masamune, 1932a, 1932b; Kanehira, 1936; Li, 1953, 1957; Li & Keng 1950; Hosokawa, 1958; Liu & Yang 1974; Kuo, 1985; Chang, 1986, 1987; Peng, 1992) for many years. Opinions vary over Taiwan's phytogeographic affinities relative to the two major floristic kingdoms, as might be expected when the geographic position (relative to mainland China, the Philippines and the Ryukyus), topographic framework and the climatic regimes are considered. Nevertheless, it is generally accepted that the strongest floristic relationships of most of Taiwan are with southern and eastern mainland China. The two largest islets, Lanyu and Lutao (off the southeast coast of Taiwan), along with the Hengchun Peninsula (in southern-most Taiwan) may be considered collectively to represent the eastern section of the zone of confluence between the so-called East Asian floristic region and the Malesian floristic region.

In this analysis the composition and affinity of the Taiwan flora are re-examined. All taxa of vascular plants recorded for Taiwan, including naturalized aliens, have been taken into account. The study is based on the taxonomic knowledge presented in the Flora of Taiwan, Second Edition (Editorial Committee of the Flora of Taiwan, 1993-2000), but 126 cultivated plants are omitted. For distribution patterns of non-endemic Taiwanese species, extensive floras and lists of countries and regions neighboring Taiwan (e.g., China, Japan, the Ryukyus, the Philippines, Java, etc.) were used for comparative studies.

TAXONOMIC RICHNESS

The vascular plants in the flora of Taiwan total 4,216 species (including infraspecific taxa) in 1,389 genera and 233 families (Table 1). Of these, approximately 5.6% (234 species) are introduced and naturalized and are typically associated with pastures, road clearings and other human disturbances. An extremely large percentage of these naturalized plants are of tropical New World origin.

Table 1. Number of taxa in the vascular flora of Taiwan by major plant group (species including infraspecific taxa), The figures in parentheses indicate the number of naturalized plants.

	Families	Genera	Species
Pteridophytes	37 (1)	144 (1)	595 (1)
Gymnosperms	8	17	28
Angiosperms	186 (46)	1153 (151)	3359 (233)
Dicotyledons	149 (39)	819 (118)	2356 (183)
Monocotyledons	37 (7)	334 (33)	1003 (50)
Total	233 (47)	1389 (152)	4216 (234)

In terms of major growth forms, there are 588 trees, 426 shrubs, 249 lianas, 177 vines, and 2776 herbs or ferns (Table 2). The epiphytes in the Taiwan flora include at least 194 species,

but these belong to only 20 families. The largest family of epiphytes is the Orchidaceae (113 species), which comprises about 58% of all epiphytic species. Other families with more than 10 species are Grammitidaceae (19 species), Polypodiaceae (13 species) and Lycopodiaceae (10 species). Woody climbers (lianas) represent about 6.9% of all flowering plants in Taiwan. The families with the most woody climbers are the Leguminosae (19 species), Vitaceae (19 species), Rosaceae (19 species), Moraceae (16 species), Asclepiadaceae (15 species) and Ranunculaceae (14 species). Five families, Orchidaceae (23 species), Pyrolaceae (4 species), Burmanniaceae (4 species), Petrosaviaceae (1 species) and Triuridaceae (2 species), have saprophytic members. Species regarded as parasites are known from 6 families: Loranthaceae (18 species), Balanophoraceae (4 species), Orobanchaceae (4 species), Convolvulaceae (3 species), Rafflesiaceae (2 species) and Lauraceae (1 species). Of the naturalized taxa, herbs are the dominant life form, making up 81.2% of the flora.

Table 2. Number of species in different growth forms in the Taiwan flora. The figures in parentheses indicate the number of naturalized plants.

	Trees	Shrubs	Lianas	Vines	Herbs
Pteridophytes	3	5	0	8	580 (1)
Gymnosperms	26	2	0	0	0
Dicotyledons	548 (4)	415 (13)	240 (4)	130 (23)	1206 (139)
Monocotyledons	11	4	9	39	990 (50)
Total	588 (4)	426 (13)	249 (4)	177 (23)	2776 (190)
Percentage	13.9	10.1	5.9	4.2	65.8
Evergreen trees: 459	Deciduous trees: 125	Epiphytes: 194	Parasites: 32	Saprophytes：34	

Of the 233 families in the Taiwan flora, the Orchidaceae (331 species), Gramineae (249 species), Compositae (194 species), Leguminosae (176 species), Cyperaceae (174 species), Rosaceae (105 species), Rubiaceae (93 species), Dryopteridaceae (78 species) Euphorbiaceae (76 species) and Labiatae (70 species) rank highest in numbers of species (Table 3). These ten families comprise approximately 36.7% of the species found in Taiwan. Three families, Compositae, Gramineae and Leguminosae contain more than 52% of all naturalized plants. Of the total flora, 44 families are represented by only a single species. The average number of species per family is approximately 18.1.

Table 3. The 20 most species-rich families in the Taiwan flora, ranked by number of species.

Family	No. of species	Family	No. of species
Orchidaceae	331	Lauraceae	64
Gramineae	248	Scrophulariaceae	64
Compositae	194	Urticaceae	63
Leguminosae	176	Polypodiaceae	62
Cyperaceae	174	Athyriaceae	52
Rosaceae	105	Fagaceae	52
Rubiaceae	93	Moraceae	48
Dryopteridaceae	78	Liliaceae	47
Euphorbiaceae	76	Thelypteridaceae	47
Labiatae	70	Ranunculaceae	46

At the genus level, the largest is *Carex* (61 species), followed by *Rubus* (39 species), *Ficus* (37 species), *Polygonum* (36 species), *Asplenium* (35 species), *Dryopteris* (29 species), *Pteris* (29 species), *Fimbristylis* (28 species), *Polystichum* (28 species) and *Symplocos* (27 species) (Table 4). A most noteworthy fact about the flora, aside from the great number of genera, is the exceedingly large proportion of monotypic and oligotypic ones. About 51% (707 genera) of the genera in Taiwan are represented by only a single species and 18.6% (261 genera) have only two species. In contrast, only 6% of the genera have more than 10 species. The mean number of species per genus is approximately 3.2.

Table 4. The 20 most species-rich genera in the Taiwan flora, ranked by number of species.

Genus	No. of species	Genus	No. of species
Carex	61	*Cyperus*	24
Rubus	39	*Ilex*	24
Ficus	37	*Bulbophyllum*	21
Polygonum	36	*Diplazium*	21
Asplenium	35	*Liparis*	21
Dryopteris	29	*Lycopodium*	21
Pteris	29	*Athyrium*	20
Fimbristylis	28	*Clematis*	20
Polystichum	28	*Calanthe*	19
Symplocos	27	*Desmodium*	19

Endemism

Endemic genera

There are no endemic families of plants in Taiwan. The endemic genera appear to number 4, and each of them is monotypic:

1. *Sinopanax* H. L. Li (Araliaceae)
   S. formosana (Hayata) H. L. Li (distributed at mid elevations)
2. *Hayataella* Masam. (Rubiaceae)
   H. michelloides Masam. (recorded once in eastern Taiwan)
3. *Kudoacanthus* Hosok. (Acanthaceae)
   K. albonervosa Hosok. (distributed at low elevations in the eastern Coastal Range and in the southeastern part of the Central Range)
4. *Haraella* Kudo (Orchidaceae)
   H. retrocalla (Hayata) Kudo (widely distributed at low and middle elevations)
   Hayataella will be treated under *Ophiorrhiza* in *Flora Reipublicae Popularis Sinicae* (*Ophiorrhiza michelloides* (Masam.) H. S. Lo, Bull. Bot. Res., Harbin 18(3): 277. 1998), but was considered to be distinct by Ying *et al.* (1993).

Endemic species

In contrast to the low percentage of generic endemism, there is remarkably higher specific endemism. About 1041 species (26.1% of native plants) are known only from Taiwan (Table 5). One hundred and thirty five families have at least one endemic species. The Orchidaceae, Compositae, Rosaceae and Gramineae rank highest in numbers of endemic species (Fig. 1), however, the proportion of specific endemism is highest in the Gentianaceae (80%), followed by the Theaceae (62.2%), Caryophyllaceae (60%) and Ericaceae (60%).

Table 5. Number of endemic plants and their proportion in the Taiwan flora.

	Endemic	Native	Percentage
Pteridophytes	65	595	10.9
Gymnosperms	17	28	60.7
Dicotyledons	735	2356	31.2
Monocotyledons	224	1003	22.3
Trees	178	587	30.3
Shrubs	171	413	41.4
Lianas & vines	94	399	23.6
Herbs	598	2583	23.1
Total	1041	3982	26.1

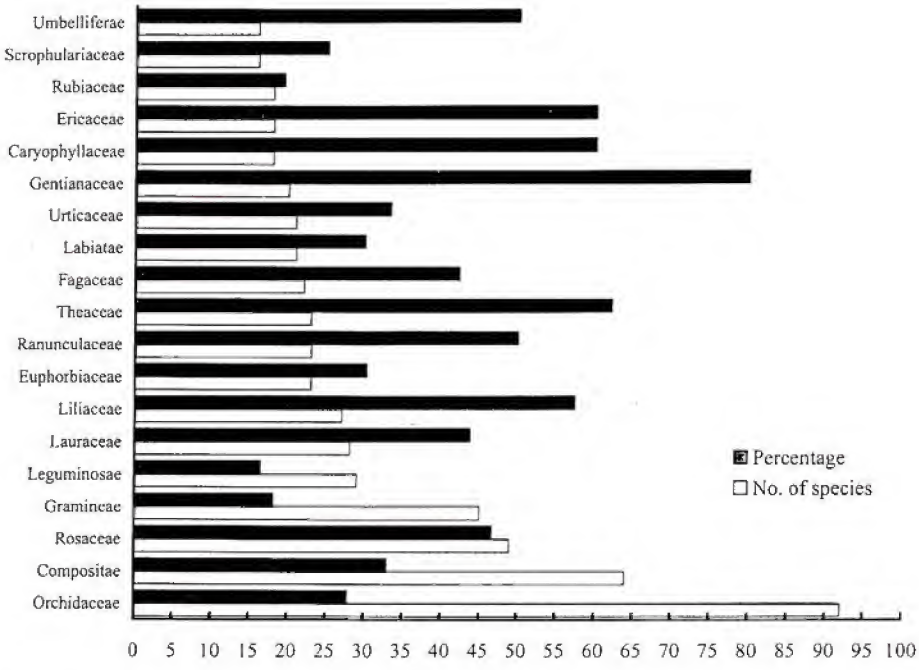

Fig. 1. Families with the most endemic species and percentage of endemics within the family in Taiwan.

To analyze species richness and endemic richness patterns along an altitudinal gradient, the altitudinal distribution ranges have been worked out separately for each native species. The altitudinal gradient was divided into six vertical intervals (Fig. 2). With increasing elevation, the number of species decreases steeply, but the percentage of endemic species gradually increases. Thus, the proportion of endemic species increases from 15.9% in the lowlands to 59.8% at high elevations, and a high positive correlation ($r^2 = 0.99$) is found between endemism and altitude (Fig. 3). From Fig. 2, it is also clear that the greatest portion of Taiwan's floristic richness is in the wealth of species in primarily lowland situations.

At the regional level, more endemic species are widespread (present in more than three regions) (Table 6). This applies to both low and high elevations. The distribution of the remaining species is quite varied. In the lowlands, the Hengchun Peninsula in southernmost Taiwan has the greatest number of endemic species, followed by the central and northern regions. Endemism, however, is more localized at high elevations.

Geographical distribution of the species

An examination of the no-endemic species on the basis of their geographical distributions outside Taiwan shows that they can be classified into six main types; some of them can be further divided into various subtypes. For each type or subtype six species are given as examples.

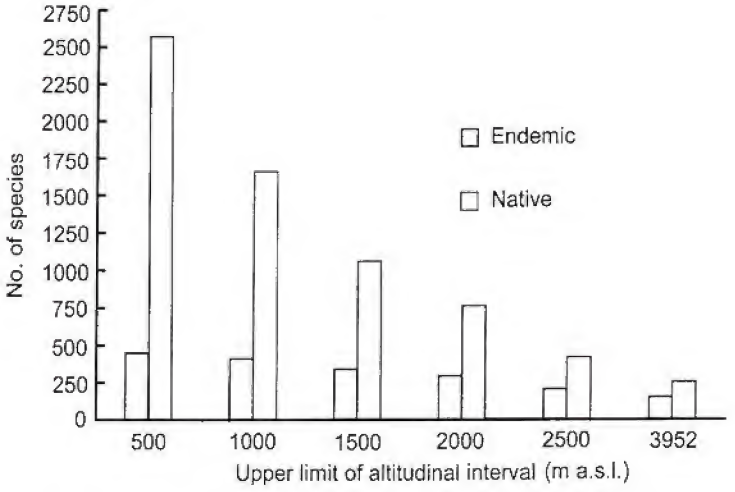

Fig. 2. Altitudinal distribution of native and endemic species.

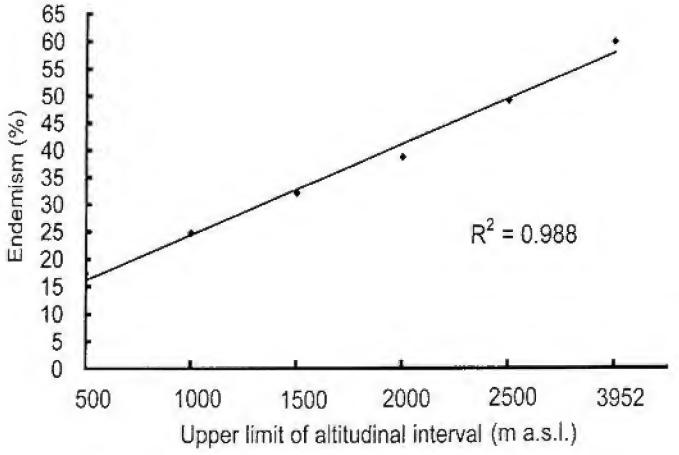

Fig. 3. Relationship between altitude and endemism

Table 6. Distribution of endemic species in northern, central, eastern and southern Taiwan, on the Hengchun Peninsula, and on Lanyu Island (number in parentheses indicates number of species restricted to that area).

Altitude (meters)	<1500		1500—		>2500	
Northern region	134	(51)	105	(22)	66	(12)
Central region	151	(41)	145	(36)	85	(20)
Eastern region	99	(40)	77	(29)	18	
Southern region	122	(36)	47	(5)	33	(12)
Hengchun Peninsula	167	(55)	20	(1)	—	
Lanyu Island	67	(35)	—		—	
Widespread species	204		223		147	

1. Tropical species (1,029 species)

1a. Pantropical species (105 species)

Psilotum nudum — *Histiopteris incisa*
Chamaesyce prostrata — *Ludwigia octovalvis*
Eclipta prostrata — *Panicum repens*

1b. paleotropical species (177 species)

Dicranopteris linearis — *Asplenium nidus*
Alysicarpus vaginalis — *Rhizophora mucronata*
Blumea mollis — *Liparis cespitosa*

1c. Species of the Asiatic tropical region only (622 species)

Humata vestita — *Bischofia javanica*
Cerbera manghas — *Viburnum luzonicum*
Paspalum orbiculare — *Vanilla albida*

1d. Species distributed in the Philippines and Taiwan (125 species)

Plagiogyria formosana — *Podocarpus costalis*
Leea philippinesis — *Diospyros philippinensis*
Timonius arboreus — *Phalaenopsis aphrodite*

2. Eastern Asiatic species (1,075 species)

2a. Eastern Himalaya—southern & eastern China—Taiwan—Japan (some species extend into northern Indochina) (130 species)

Cyathea spinulosa — *Cyclobalanopsis glauca*
Glochidion acuminatum — *Corydalis ophiocarpa*
Eriocaulon nepalense — *Calanthe alpina*

2b. Eastern Himalaya—southern China—Taiwan (102 species)

Microlepia calvescens — *Stachyurus himalaicus*
Castanopsis indica — *Ainsliaea latifolia* subsp. *henryi*
Arisaema consanguineum — *Calanthe clavata*

2c. Southern China—Taiwan—Ryukyu—Japan (415 species)

Cyathea lepifera — *Woodwardia kempii*
Nageia nagi — *Cinnamomum camphora*
Schefflera octophylla — *Liriope spicata*

2d. Species distributed in southern China and Taiwan (361 species)

Plagiogyria dunnii — *Pinus taiwanensis*
Juglans cathayensis — *Cyclobalanopsis championii*
Liquidambar formosana — *Phoenix hanceana*

2e. Species discontinuously distributed between southwestern China and Taiwan (67 species)

Lycopodium veitchii — *Pteris dactylina*
Potentilla leuconota — *Swertia macrosperma*
Anaphalis nepalensis — *Hemipilia cordifolia*

3. Species distributed from tropical Asia to eastern Asia (including S. Japan and S. Korea) (232 species)

Cheilanthes argentea — *Polygonum longisetum*

Oenanthe javanica *Salvia plebeia*
Centipeda minima *Eragrostis multicaulis*

4. Species distributed in Taiwan, the Ryukyus and four main islands of Japan (189 species)

4a. Species distributed in Taiwan, the Ryukyus and Japan (80 species)

Pteris nipponica *Trochodendron aralioides*
Michelia compressa *Litsea aciculata*
Microtropis japonica *Listera japonica*

4b. Species distributed in Taiwan and Japan, absent from the Ryukyus (42 species)

Polystichum kiusiuense *Corylopsis pauciflora*
Coptis quinquefolia *Potentilla nipponica*
Enkianthus perulatus *Habenaria iyoensisi*

4c. Species distributed in Taiwan and the Ryukyus (67 species)

Polystichum formosanum *Illicium tashiroi*
Ilex kusanoi *Burmannia liukiuensis*
Freycinetia formosana *Cheirostylis takeoi*

5. North temperate and subboreal species (221 species)

Lycopodium annotinum *Botrychium lunaria*
Sibbaldia procumbens *Viola biflora*
Pedicularis verticillata *Phleum alpinum*

6. Cosmopolitan species (72 species)

Ophioglossum petiolatum *Chenopodium album*
Ceratophyllum demersum *Verbena officinalis*
Cyperus rotundus *Poa annua*

FLORISTIC RELATIONSHIPS

Although particular interest in the native flora of Taiwan lies in the nature and degree of its affinity with the flora of eastern Asia, its relationship with the flora of tropical Asia is almost equally as important. Table 7 shows that both eastern Asian and tropical Asian elements make up no less that 27% of the total flora. The endemic species are of course also well represented. The northern element, whether temperate or subboreal is proportionally poorly represented in Taiwan.

Table 7. World distribution of the 3,962 species of vascular plants in Taiwan.

Type of distribution	No. of species	Percentage
Tropical	1082	27.17
Eastern Asiatic	1115	28.00
Tropical Asia to Eastern Asia	231	5.80
Taiwan & Japan	215	5.40
North temperate	221	5.55
Cosmopolitan	73	1.83
Endemic	1041	26.14
Other	4	0.10

Within Takhtajan's (1986) global floristic system, the Hengchun Peninsula and Lanyu and Lutao islands are assigned to the Philippinean Province of the Paleotropical Kingdom.

An analysis of 676 species from Lanyu Island (Table 8) shows that roughly 56% of the species are tropical elements, whereas eastern Asian elements are relatively poorly represented. A similar trend can be found in the 913 species from the Hengchun Peninsula (Table 9). The proportion of tropical elements, however, decrease to 43% and the proportion of eastern Asian elements increases to 23.3%.

A comparison of the species common to Taiwan and adjacent regions reveals some conspicuous trends. The proportion of species common to Taiwan and the Philippines is highest on Lanyu Island and decreases from south to north on Taiwan proper.

Table 8. World distribution of the vascular plants (676 species) on Lanyu Island.

Type of distribution	No. of species	Percentage
Tropical	381	56.36
Eastern Asiatic	100	14.79
Tropical Asia to Eastern Asia	62	9.17
Taiwan & Japan	43	6.10
North temperate	9	1.33
Cosmopolitan	16	2.41
Endemic to Lanyu	35	5.25
Endemic to Lanyu & Taiwan	30	4.26

Table 9. World distribution of the vascular plants (913 species) on the Hengchun Peninsula.

Type of distribution	No. of species	%
Tropical	393	43.04
Eastern Asiatic	213	23.33
Tropical Asia to Eastern Asia	70	7.67
Taiwan & Japan	43	4.71
North temperate	8	0.88
Cosmopolitan	17	1.86
Endemic	46	5.04
Other	123	13.47

For species shared between Taiwan and Japan, the proportion decreases from north to south (Fig. 4), but a relatively higher percentage of these species is found on the Hengchun Peninsula and on Lanyu Island.

Along an altitudinal gradient, the proportion of species shared by Taiwan and the Philippines shows a striking decrease with increasing elevation (Fig. 5), but there is no consistent trend for species shared by Taiwan and Japan or Taiwan and mainland China.

A comparison of the Taiwan flora with treatments published in floras and checklists from China, Japan, the Ryukyus, and the Philippines (Table 10) reveals that about 52% (2069 species) of the Taiwanese species are known also from southern and eastern China. The percentage of species shared between Taiwan and Japan ranks second (42.1%). Only about 30% of the species occur also in the Philippines or farther south. From this it is evident that the affinities of more than half of the Taiwan flora lie to the west with taxa mainly from southern and eastern China. It is worthwhile to note that among the species shared between

Taiwan and Japan, about 1360 (80.7%) are found also in southern and eastern China. It appears that the conclusion drawn by Hosokawa (1958) from an analysis of the genera - that the close floristic relationship between Japan and Taiwan is through their mutual relationship to the lowland and lower montane flora of mainland China - is confirmed by the present much larger survey of the flora. Although Taiwan shares a large number of species of plants with mainland China, the number of species confined only to Taiwan and China is comparatively. The same trend is also found for species shared between Taiwan and Japan and Taiwan and the Philippines.

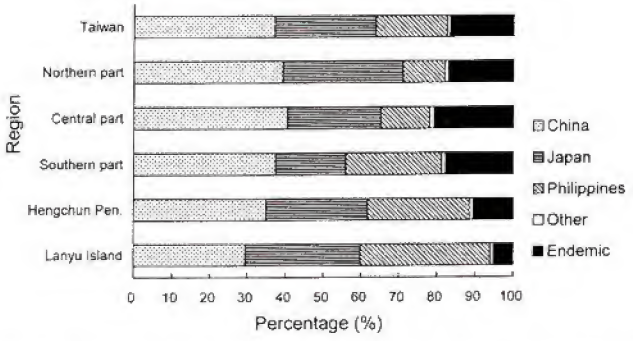

Fig. 4. The proportion of various floristic elements occurring in Taiwan and its different parts.

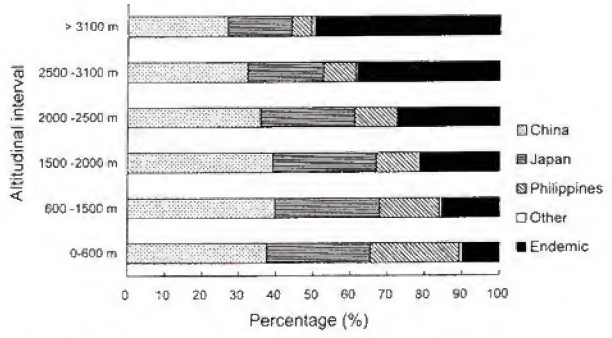

Fig. 5. Proportion of various floristic elements occurring in different altitudinal zones on Taiwan.

A comparison of species shared by Taiwan, China, Japan and the Philippine shows that only about 26% of the species shared by Taiwan and the Philippines are absent in China, and about 18.5% of the species shared by Taiwan and Japan do not occur in China. This pattern is mainly due to the presence of many common and widely distributed species of either tropical or eastern Asiatic origin.

Table 10. Number of vascular plant species shared between Taiwan and its adjacent regions.

Regions	Species	Percentage
Species common to Taiwan, southern and eastern China	2069	52.0
Species common to Taiwan and Japan (including Ryukyu)	1677	42.1
Species common to Taiwan and Japan	1217	30.6
Species common to Taiwan and Ryukyu	1210	30.4
Species common to Taiwan and the Philippines	1182	29.7
Species endemic to Taiwan and China	270	
Species endemic to Taiwan and Japan (including Ryukyu)	189	
Species endemic to Taiwan and the Philippines	125	

It is rather remarkable that about 1,423 species that are found in both Taiwan and mainland China, have never been found in the Philippines (Table 11). The species shared by Taiwan and Japan, but which are absent from the Philippines, number 1029. From this it appears that the Bashi Channel between Taiwan and Luzon forms an important plant-geographical barrier for the southward movement of the Eastern Asiatic elements, as indicated earlier by Steenis (1948).

Table 11. Floristic demarcation between Taiwan and its adjacent regions (figures in parentheses indicate the number of common species).

	Species	Percentage
Species common to Taiwan & China, but not occurring in Japan	967 (2,069)	46.7
Species common to Taiwan & China, but not occurring in the Philippines	1423 (2,069)	68.8
Species common to Taiwan & Japan, but not occurring in China	311 (1,677)	18.5
Species common to Taiwan & Japan, but not occurring in the Philippines	1029 (1,677)	61.4
Species common to Taiwan & the Philippines, but not occurring in Japan	565 (1,182)	47.8
Species common to Taiwan & the Philippines, but not occurring in China	307 (1,182)	26.0

CONCLUSION

1. The vascular flora of Taiwan includes 233 families, 1,355 genera and 4,216 specific and infraspecific taxa. Of these, 233 species (5.5 %) are naturalized aliens. The most noteworthy aspect of the flora, aside from the great number of genera, is the exceedingly large proportion of monotypic and oligotypic genera.
2. Only 4 genera in Taiwan are endemic, but about 1,041, or 26%, of the species are reckoned to be endemic. There is a monotonal decrease in species richness with increasing altitude, but in contrast, the proportion of endemic species increases very steadily from low to high elevations. On an island-wide level, most endemic species are widespread, but they become more localized with an increase in elevation.
3. The distribution of the 3,982 native species can be classified into six major geographic patterns. The largest groupings are the East Asiatic and tropical types.
4. The flora of Taiwan is closest to the flora of southern and eastern China, but it is also shows much in common with the flora of southern Japan. The close relationship between Taiwan and Japan is through their mutual relation to the lowland flora of southern and eastern China. Although the basic constituents of the floras of Taiwan and the Philippines are quite distinctive, their close geographic proximity allows some infiltration of tropical elements from the Philippines to Taiwan, especially in the southernmost part of Taiwan (Hengchun Peninsula and Lanyu Island). Their occurrence is often limited and decreases from the south to north in Taiwan and from low to high elevations.

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台灣維管束植物的組成、特有性及區系關係

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摘　　要

台灣維管束植物不僅豐富多樣，在植物地理上亦深具意義。依據第二版台灣植物誌，台灣自生維管束植物計 4216 種群、1389 屬、233 科，其中歸化種計 234 種群。自生種中各類別之種群數計有蕨類植物 595、裸子植物 28、雙子葉植物 2356、單子葉植物 1003。以生活型而言，其中喬木包含 588、灌木 426、木質藤本 249、草質藤本 177、草本 2776 種群。物種數最多之科別為蘭科（331）、禾本科（249）、菊科（194）、豆科（176）、及莎草科（174）。物種數最多之屬依序為薹屬（61）、懸鉤子屬（39）、榕屬（37）、蓼屬（36 種）、及鐵角蕨屬（35）。特有屬僅有四屬，但特有種有 1041 種，特有率達 26.1%。經仔細核對，特有種之比率由低海拔地區之 16%隨海拔之升高而遞增，到海拔 2500 公尺以上之山區其特有率可達 60%。核對台灣自生種（特有種除外）在台灣以外地區（包括日本、琉球、中國、菲律賓等地）的分佈，加以歸納可區分出六種地理分佈型加上若干亞型。就植物區系而言，東亞物種（占 28%）、熱帶物種（27.2%、）及特有物種（26%）旗鼓相當。與鄰近地區之關係，以中國華南及華中最為密切，共通種計 2069 種，占台灣全部種數的 52%；與琉球及日本的共通種居次，計 1677 種，占 42%。

關鍵詞：海拔分佈、多樣性、植物區系、生活型、歸化植物、維管束植物。

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